SOUTH DAKOTA DEPARTMENT OF HEALTH

SOUTH DAKOTA DEPARTMENT OF HEALTH

2022 Tuberculosis Program Annual Report

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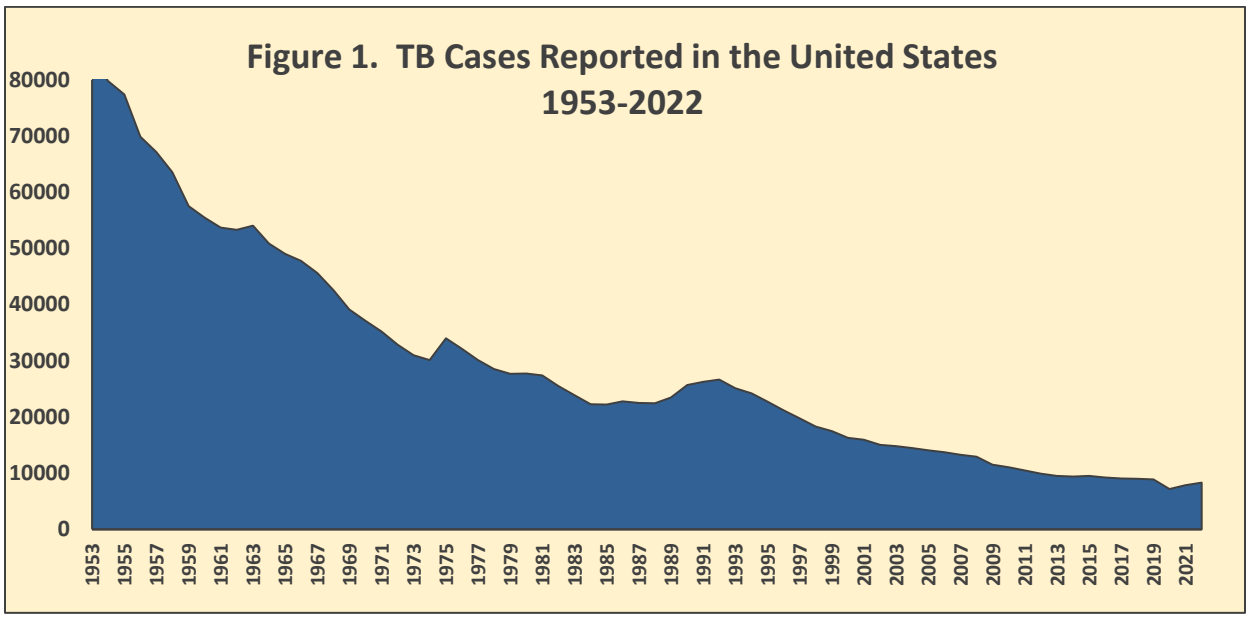
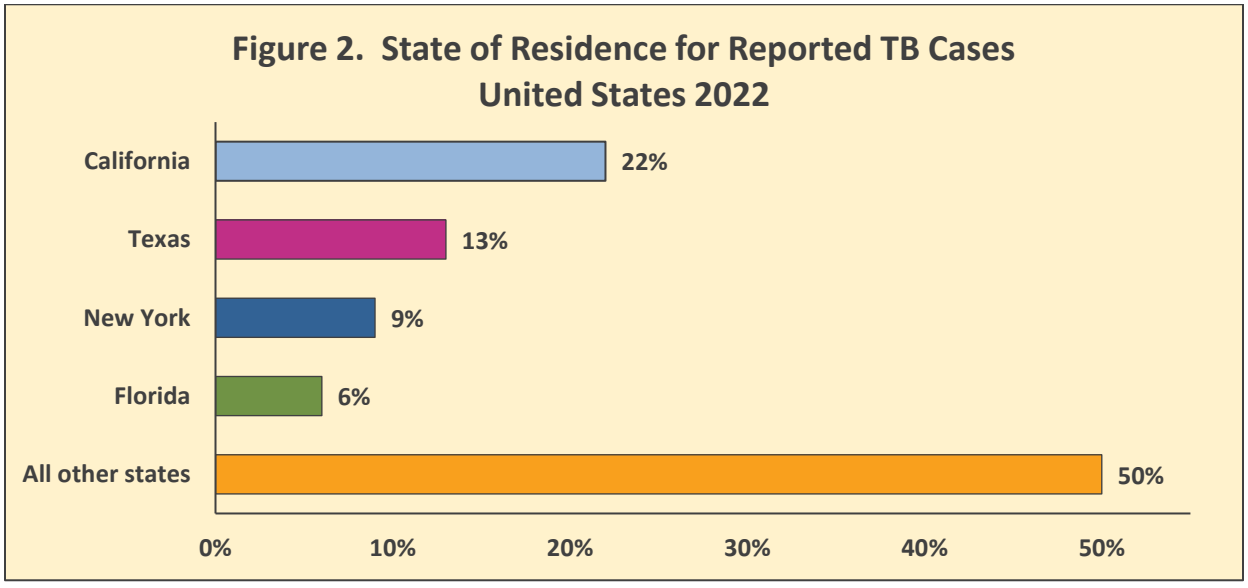
EPIDEMIOLGY OF TUBERCULOSIS IN THE UNITED STATES

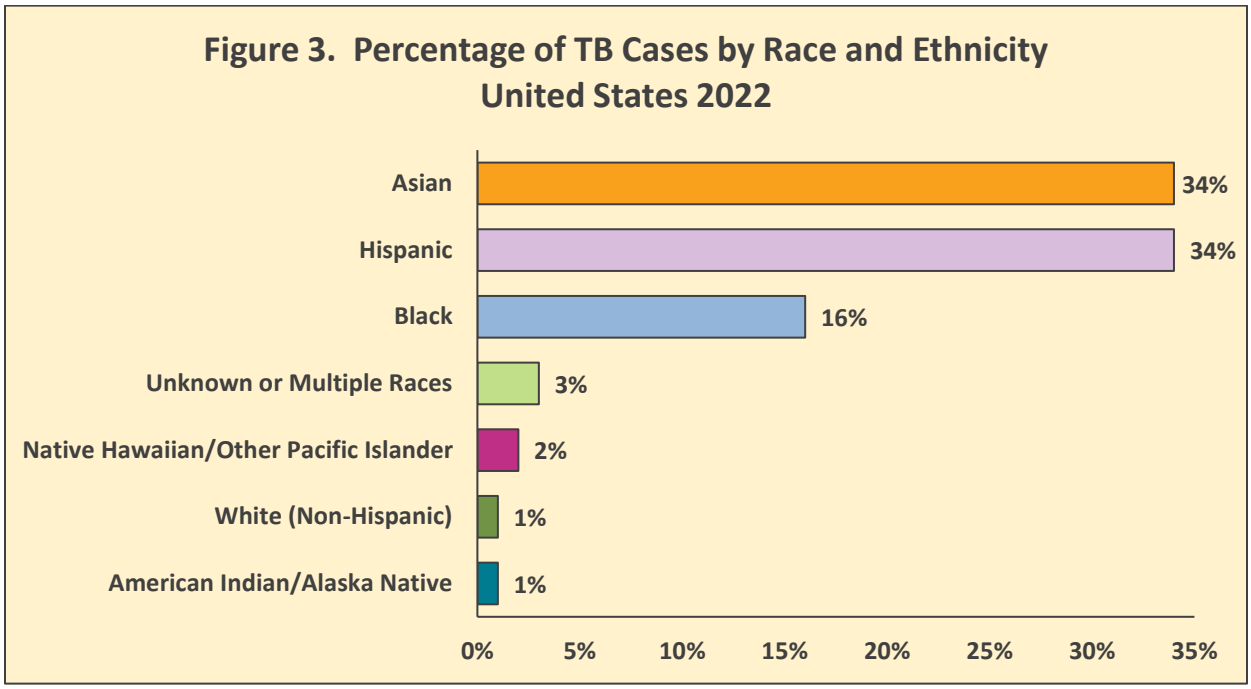
Tuberculosis (TB) is an airborne infectious disease that remains a significant public health concern. National reporting of tuberculosis cases has occurred for all state jurisdictions since 1953 with incidence rates remaining high for decades. The incidence of TB decreased gradually during the period of 1993 to 2019, reaching 2.7 cases per 100,000 in 2019. Incidence substantially declined in 2020 to 2.2 cases per 100,000, coinciding with the COVID-19 pandemic. During 2021, TB incidence partially rebounded but remained substantially below pre-pandemic years. During 2022, TB incidence increased slightly to 2.5 cases per 100,000 representing a total of 8,300 cases. Figure 1 illustrates the total number of reported TB cases in the United States since 1953.



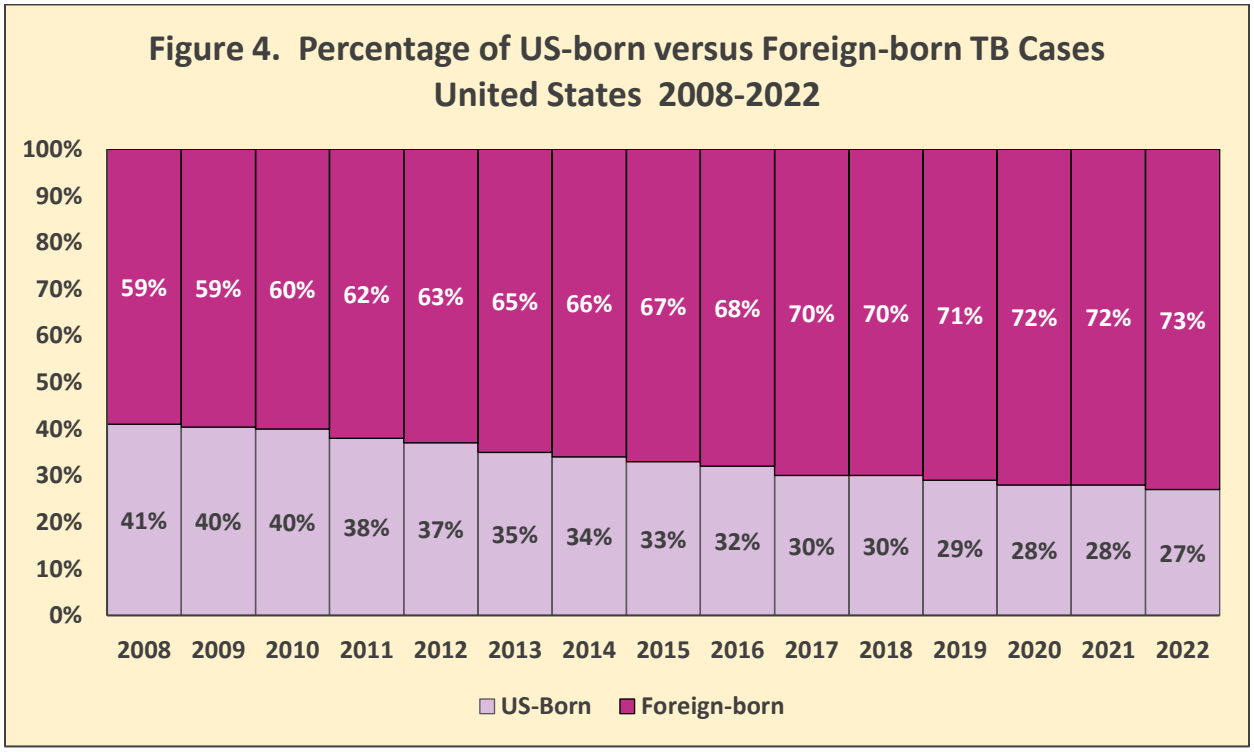
Every state in the United States reported TB cases in 2022 however the four states of California, Texas, New York, and Florida accounted for 50% of the total number of cases reported as described in Figure 2.



Higher rates of TB are observed in certain racial and ethnic groups representing an ongoing health disparity. Figure 3 describes the percentage of TB cases by race in the United States in 2022.

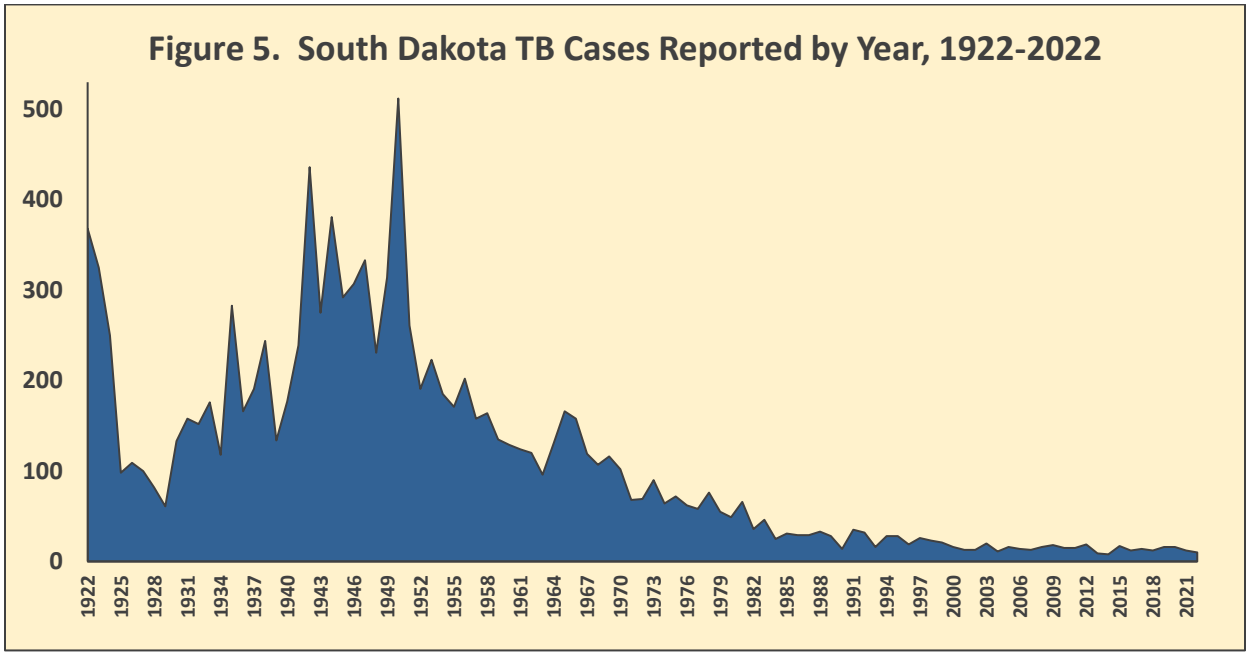


Another significant health disparity in reported TB cases is the country of birth with persons born outside the United States reporting significantly higher rates of TB. This trend has continued over time with 73% of TB cases reported in the United States in 2022 having a history of being born in another country. Figure 4 illustrates how this trend has increased over the last 15 years.

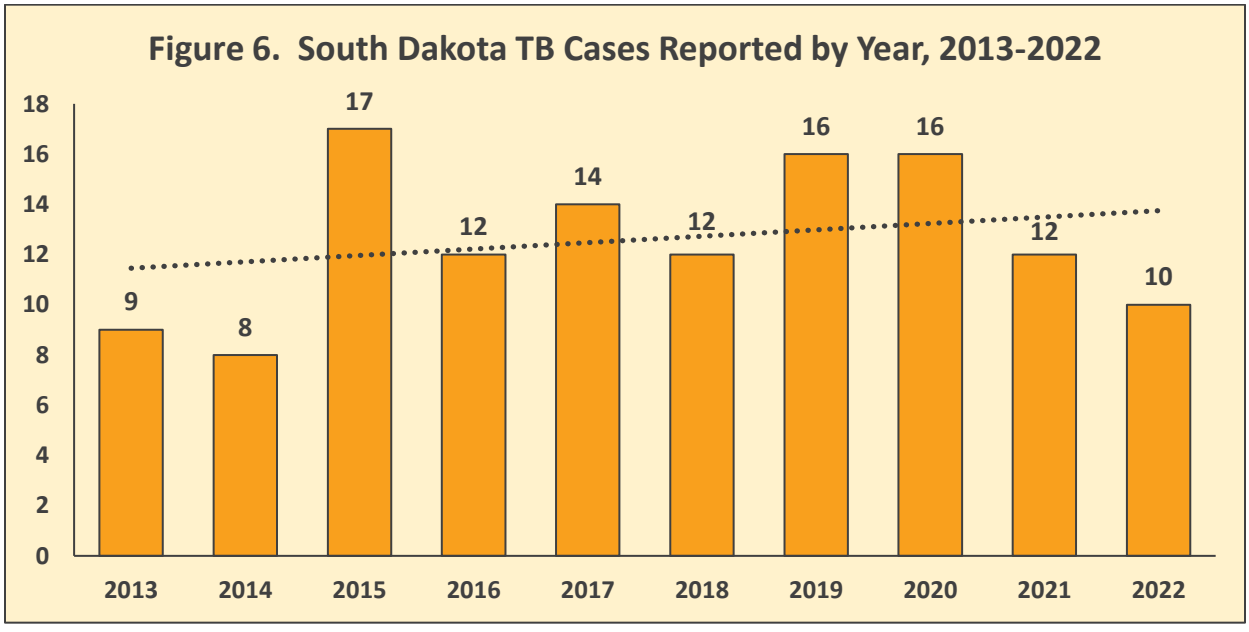


EPIDEMIOLGY OF TUBERCULOSIS IN SOUTH DAKOTA

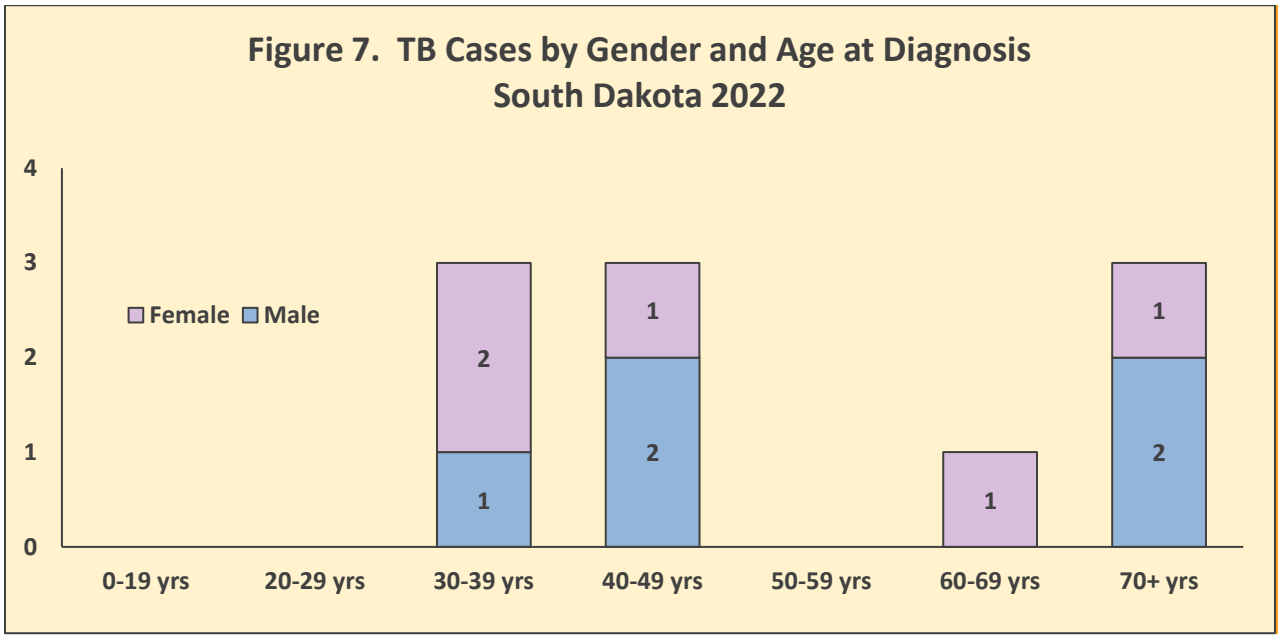
TB cases have been reported every year in South Dakota going back over a hundred years with the first official records dating to 1913. TB case rates remained high through the first half of the 20th century but there were dramatic decreases starting in the 1950's due to the development of anti-tuberculosis medications, mandatory reporting of TB cases to the South Dakota Department of Health, case management for all cases and contact investigations of persons exposed. Figure 5 illustrates a 100-year history of reported TB cases in South Dakota.



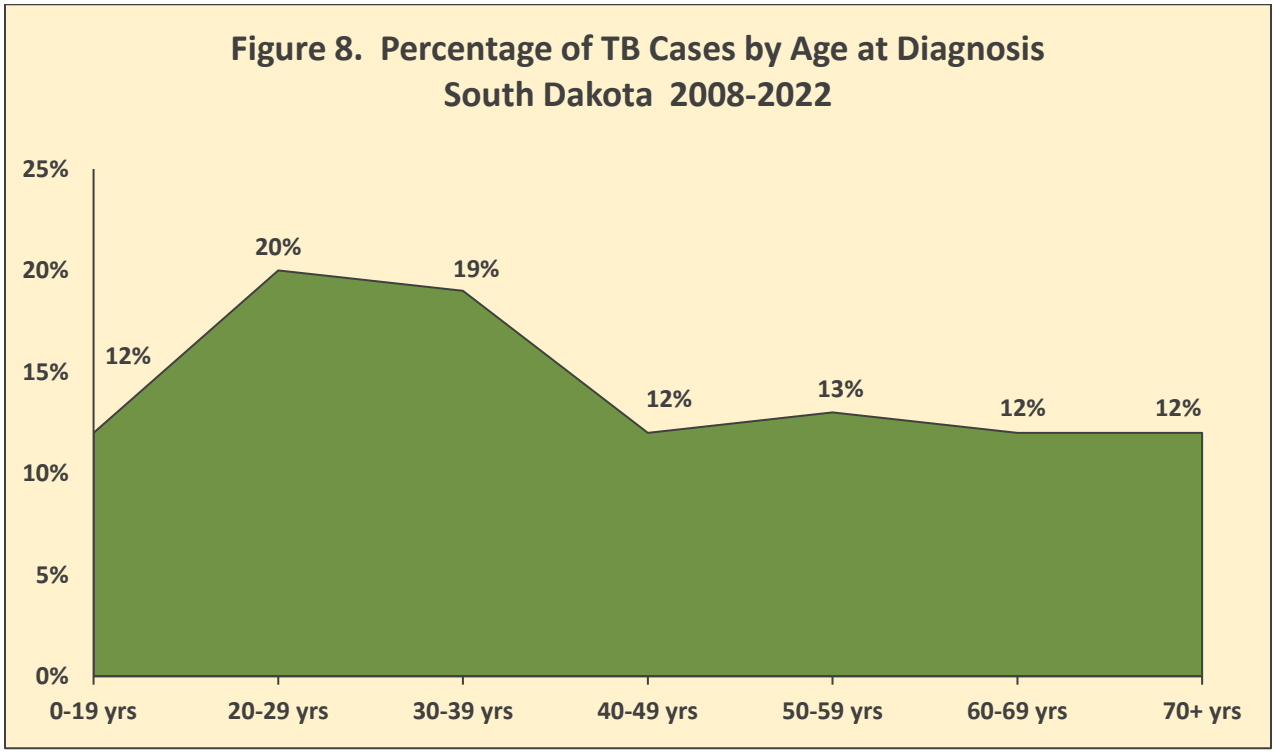
During the last 10 years, South Dakota reported an average of 13 TB cases per year. During 2022, there were 10 cases of TB reported which is a decrease from 2021 when 12 cases were reported as described in Figure 6.



The average age of a TB case in South Dakota in 2022 was 51 years of age. This is an increase in age when compared to 2021 when the average age was 42 years of age. There were no children less than 10 years of age reported in 2022. Figure 7 illustrates the age and gender at diagnosis for TB cases reported in 2022.



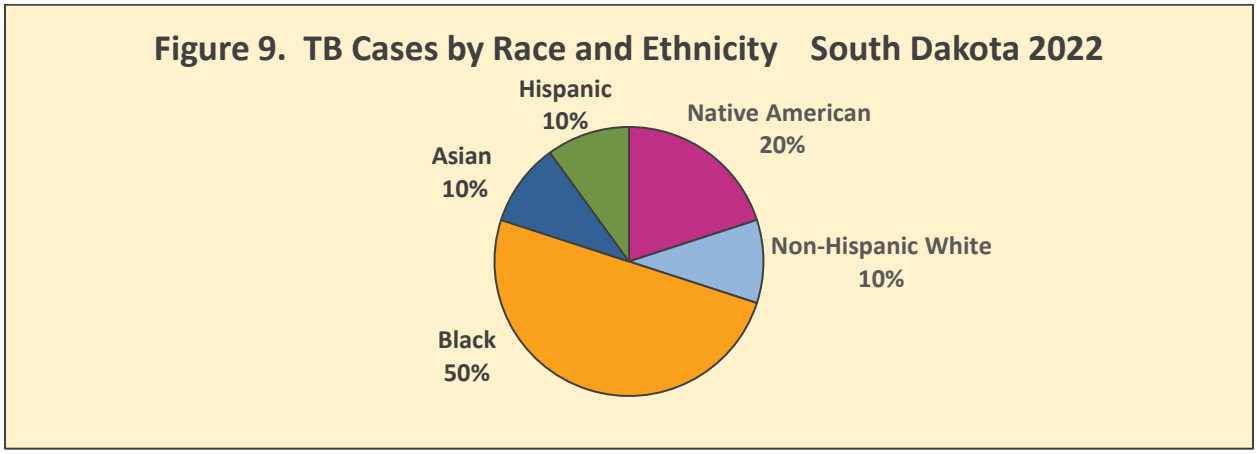
Most TB cases have historically been diagnosed in adults in South Dakota with very few cases reported in children. Figure 8 shows the percentage of TB cases by age group for the 15-year time-period of 2008 to 2022 demonstrating this trend.



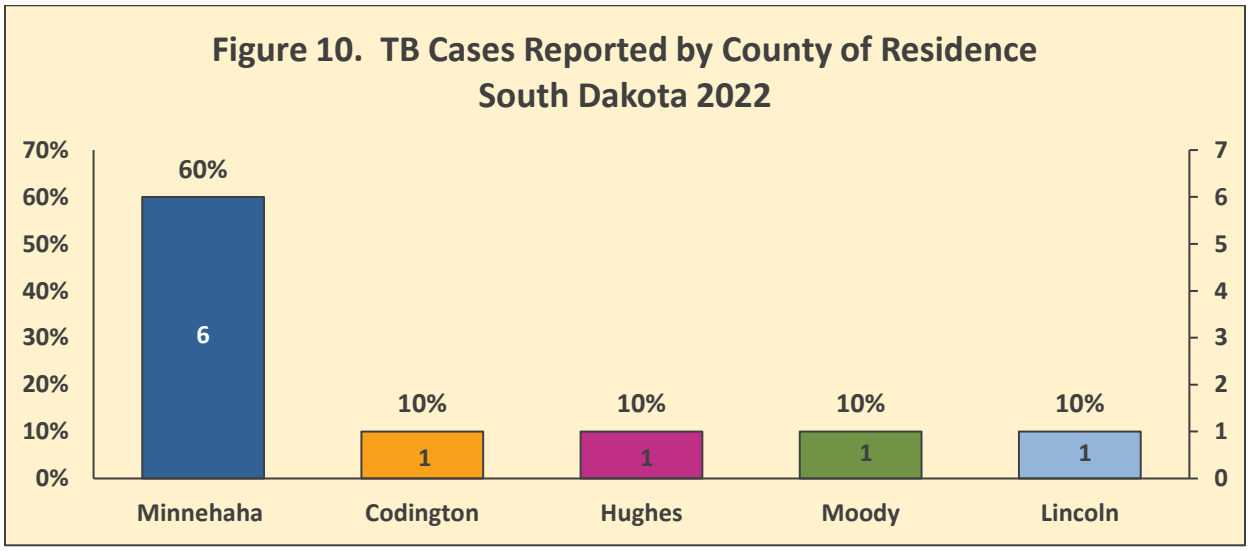
Native Americans have historically had the highest percentage of TB cases by race, however in 2022 they only contributed to 20% of the cases. More recently, a higher percentage of TB cases in persons born outside the United States has been observed like the national trend. Table 1 and Figure 9 describe detailed information on TB cases by race in 2022.

Table 1. TUBERCULOSIS CASES REPORTED BY GENDER AND AGE SOUTH DAKOTA 2022

Race	Male	Female	Total	Percentage of Cases
Native American	1	1	2	20%
Non-Hispanic White	1	0	1	10%
Black	2	3	5	50%
Asian	1	0	1	10%
Hispanic	0	1	1	10%
TOTAL	**5**	**5**	**10**	**100%**



TB cases are reported by the county of residence of the patient at the time of diagnosis. In 2022, most TB cases were reported in the southeast part of South Dakota as described in Figure 10.



The TB incidence rate, which measures the number of TB cases per 100,000 population, is the best measure for determining progress towards TB elimination in South Dakota. Native American TB case rates have decreased in recent years while Non-Hispanic White cases have consistently remained low. Black, Asian, and Hispanic cases primarily represent TB cases born outside the United States. Table 2 provides additional information on TB case rates from 2017 to 2022.

Table 2. TUBERCULOSIS INCIDENCE RATES PER 100,000 BY RACE AND YEAR SOUTH DAKOTA 2017-2022

Race	2017	2018	2019	2020	2021	2022
US All races	2.8	2.8	2.7	2.2	2.4	Not available
SD All races	1.7	1.5	2.0	1.8	1.3	1.1
SD Native American	8.5	4.9	1.2	8.7	2.7	2.7
SD Non-Hispanic White	0.1	0.6	0.4	0.2	0.4	0.1
SD Black	20.4	27.2	54.4	14.7	4.9	24.4
SD Asian	39.4	0	52.6	30.1	27.3	6.8
SD Hispanic	0	0	0	0	5.0	2.5

Figure 11 provides a comparison of the TB case rate per 100,000 population in 2022 for the United States as well as a regional comparison of South Dakota and the border states of North Dakota, Minnesota, Iowa, Nebraska, Wyoming, and Montana.

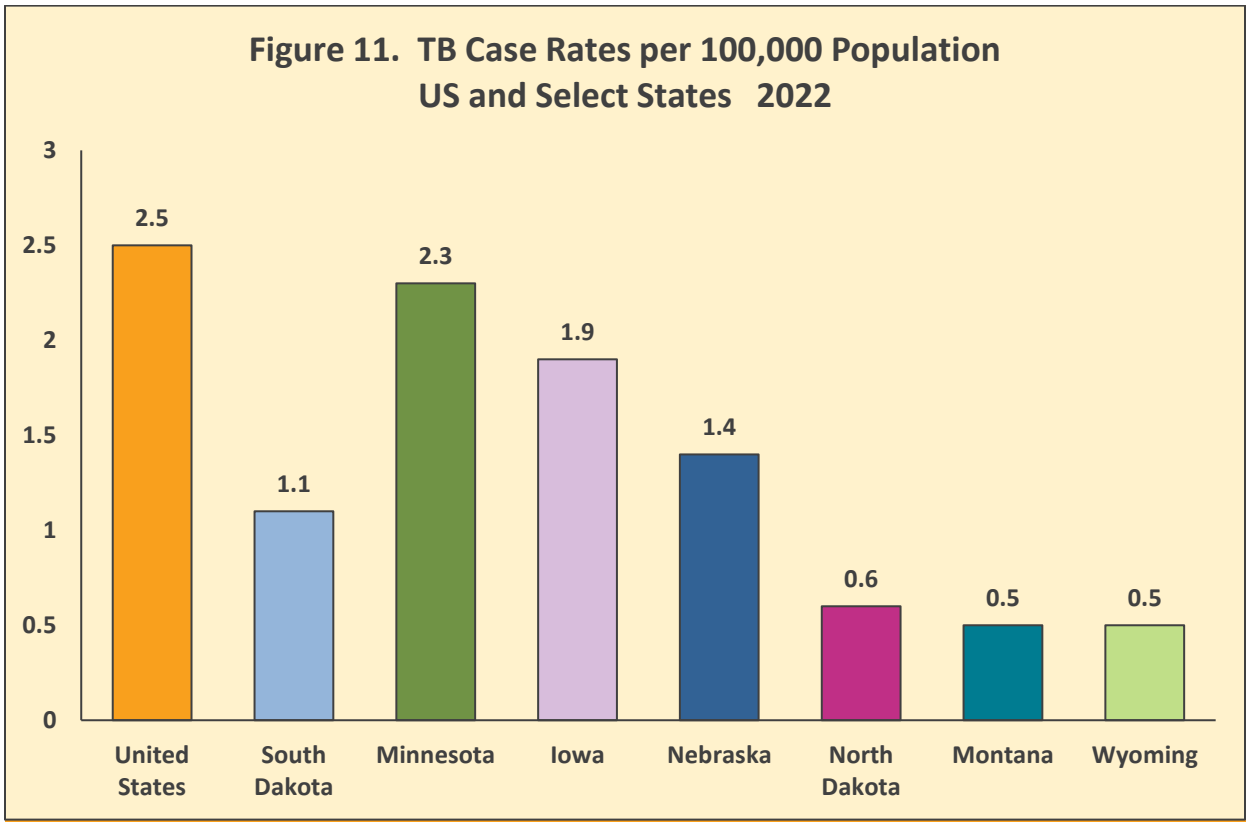
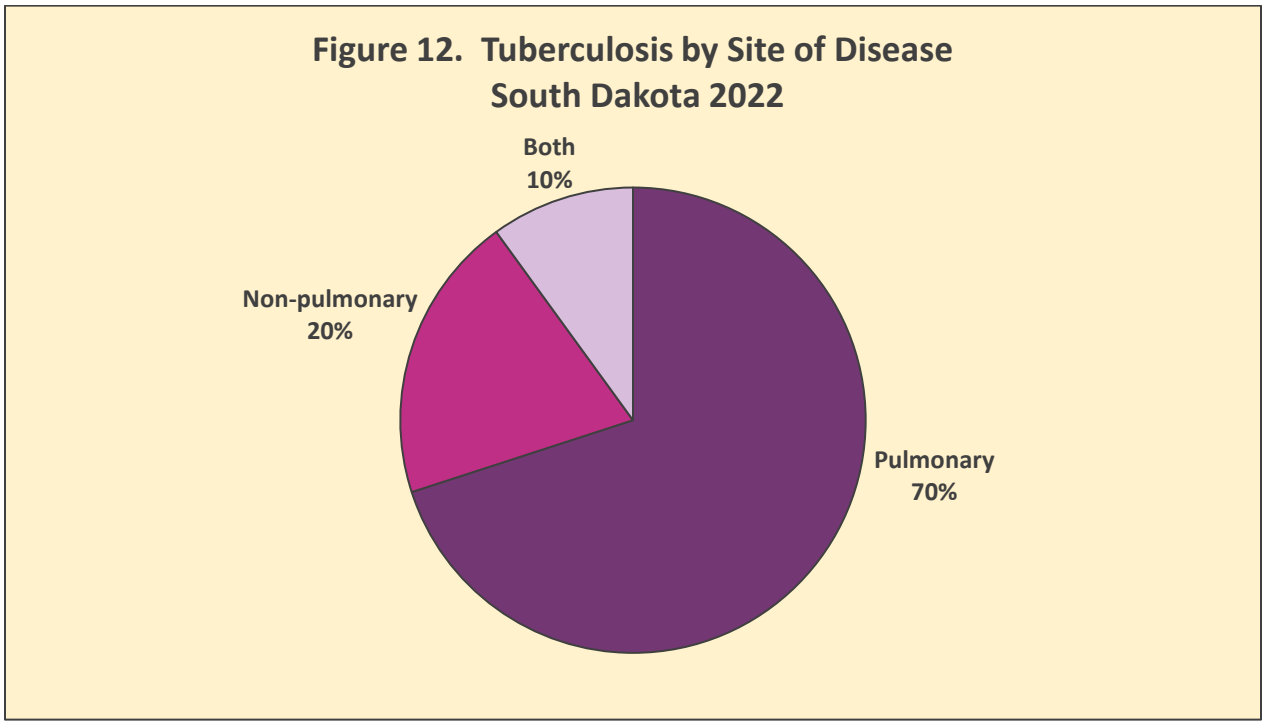
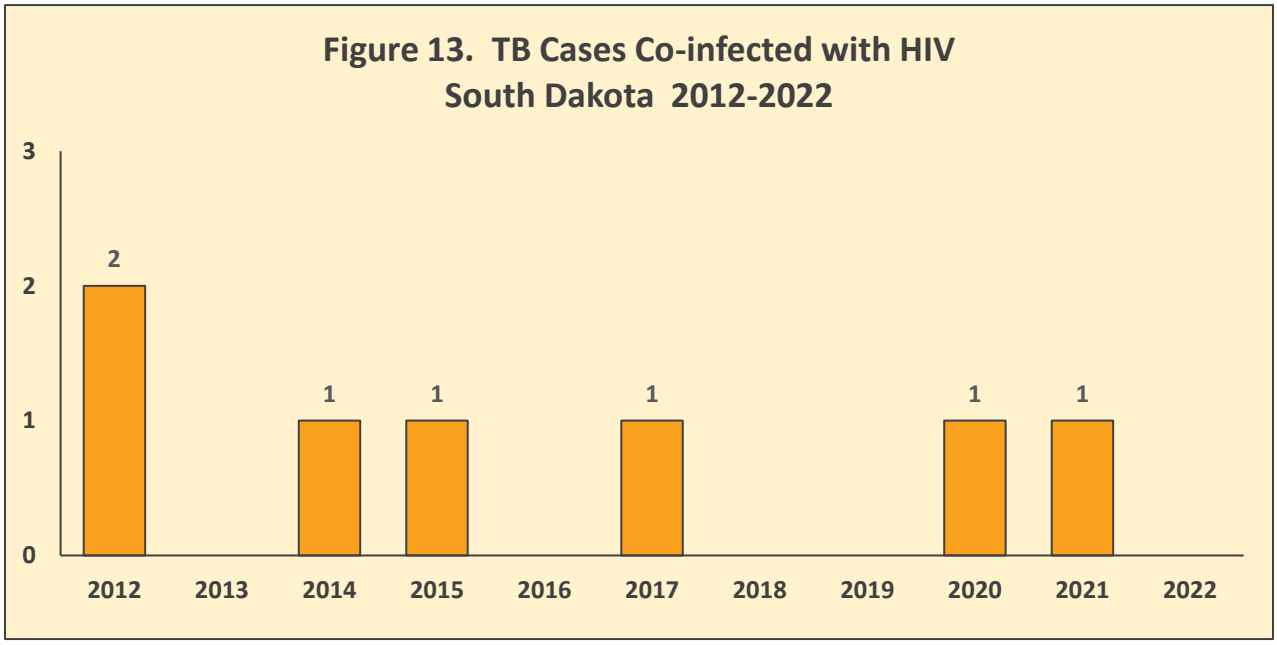


Figure 12 describes the percentage of TB cases by site of disease. The non-pulmonary TB sites of disease in 2022 include pleural, peritoneal, and lymphatic.

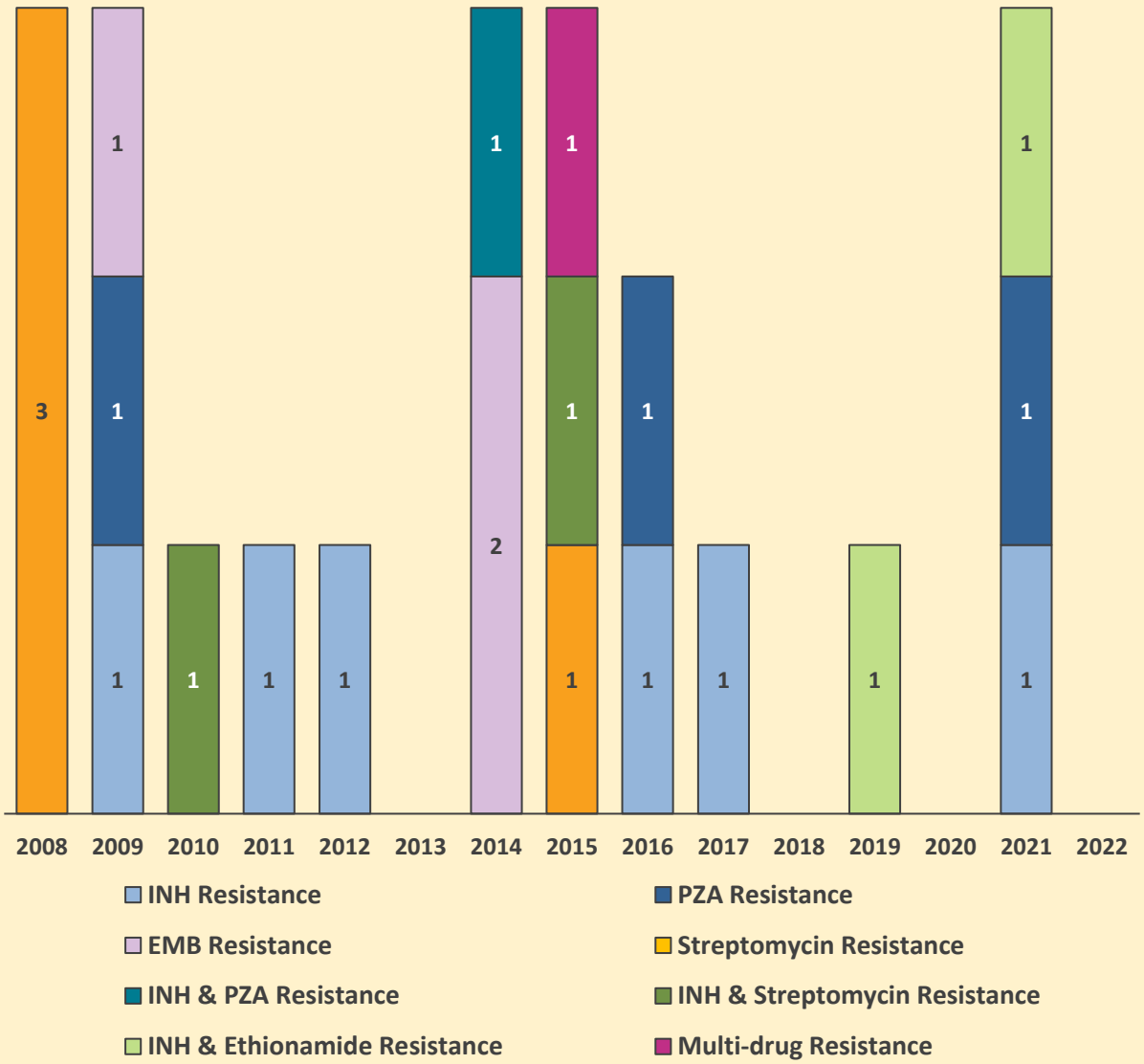


Co-infection with HIV is an important risk factor that increases the risk of developing active TB, therefore all TB cases diagnosed in South Dakota are offered HIV testing. Co-infected TB cases require more monitoring for toxicity because they are frequently treated with second-line TB medication. Figure 13 describes the number of TB cases who are also co-infected with HIV during the years of 2012 to 2022 documenting that HIV co-infected TB cases remain uncommon.



All culture positive TB isolates submitted to the South Dakota State Public Health Laboratory are sent for drug susceptibility testing to determine if the specimen is resistant to first-line TB medications including isoniazid (INH), rifampin (RIF), pyrazinamide (PZA) and ethambutol (EMB). Multi-drug resistant TB is defined by CDC as resistance to at least Rifampin and is a significant public health problem because of the difficulty in achieving a successful treatment outcome. A drug susceptibility result showing PZA resistance is an indication the patient might be infected with *Mycobacterium bovis*. Figure 14 illustrates the drug resistance patterns for TB cases reported from 2008 to 2022 showing that South Dakota most often has single drug resistant cases. South Dakota has only reported one case of first multi-drug resistant TB case (MDR) which was reported in 2015.

Figure 14. Drug Resistance Patterns for TB Cases
South Dakota 2008 to 2022



SUMMARY OF LATENT TB INFECTION IN SOUTH DAKOTA

Although the treatment and case management of confirmed TB cases is the highest priority of the TB Program, to ultimately achieve tuberculosis elimination in South Dakota, the TB Program must emphasize preventing future cases of tuberculosis. This is accomplished by identifying and treating persons with latent TB infection. These individuals are infected with the TB bacteria (*Mycobacterium tuberculosis*) but have not yet developed an active form of the disease. By finding and treating persons with latent TB infection, future TB cases can be prevented.

As of August 2, 2011, the South Dakota Department of Health revised the reporting requirements for latent TB infection to only report persons with latent TB infection (LTBI) who have certain risk factors because these individuals are at the highest risk for development of active TB. This reporting change allows the TB Program to focus staff time, medication and resources towards persons who have the highest risk of developing active TB. LTBI patients reported to the Department of Health are eligible for nurse case management and treatment for LTBI to prevent them from developing tuberculosis disease. Table 3 provides a description of the reportable risk factors for patient with latent TB infection in South Dakota.

Table 3. REPORTABLE TB RISK FACTORS FOR PERSONS WITH LATENT TB INFECTION IN SOUTH DAKOTA

REPORTABLE TB RISK FACTORS IN SOUTH DAKOTA
❖ Foreign-born persons who entered the United States in the last 5 years
❖ Persons evaluated for tumor necrosis factor-alpha therapy
❖ Immunosuppressive therapies
❖ Radiographic evidence of prior tuberculosis
❖ Children less than 5 years of age
❖ Close contacts to infectious tuberculosis cases
❖ HIV infection
❖ Diabetes
❖ Renal dialysis
❖ Silicosis
❖ Organ transplant
❖ Head and neck cancers
❖ Leukemia
❖ Hodgkin's disease

For more information about reporting patient with latent TB infection, please visit the TB Program website at: https://doh.sd.gov/diseases/infectious/TB/.

Figure 15 describes the number of persons reported to the TB Program with reportable TB risk factors over the last 10 years.

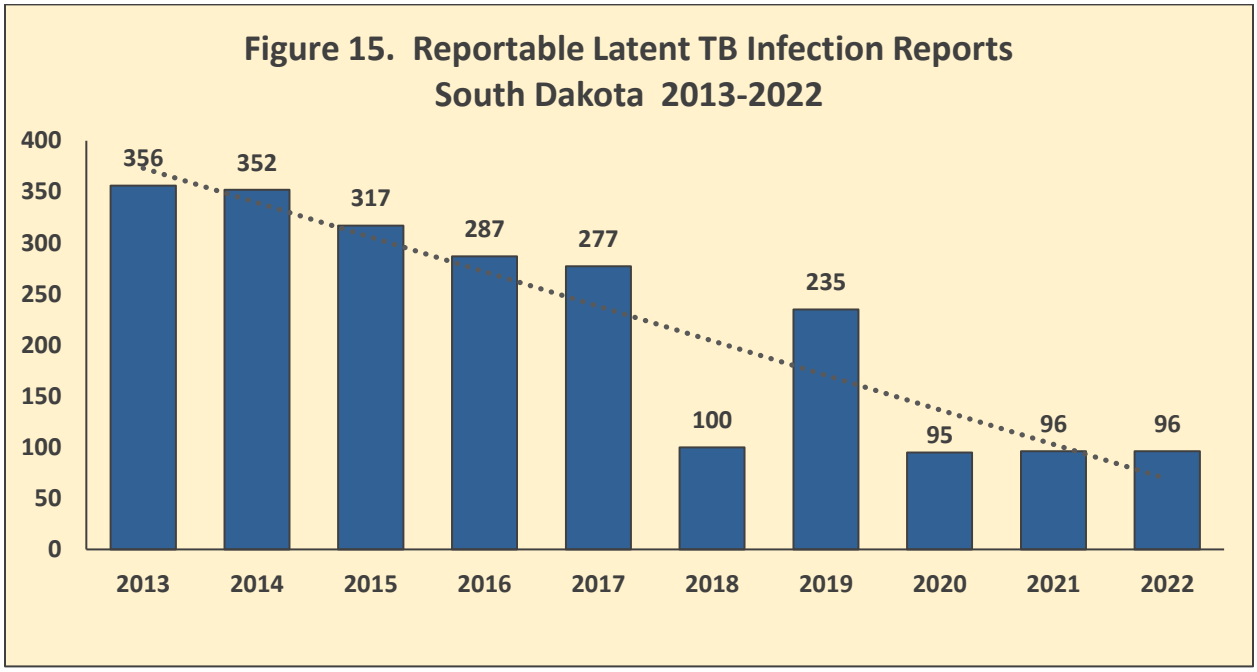
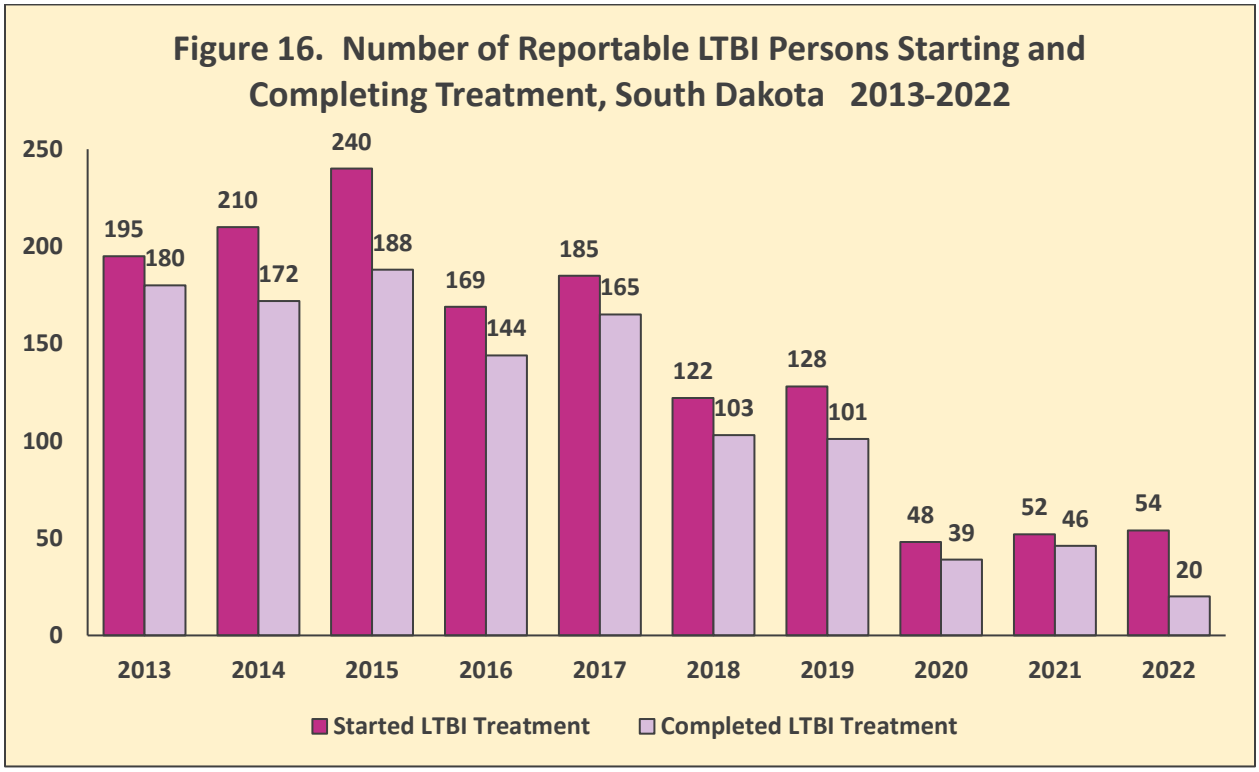
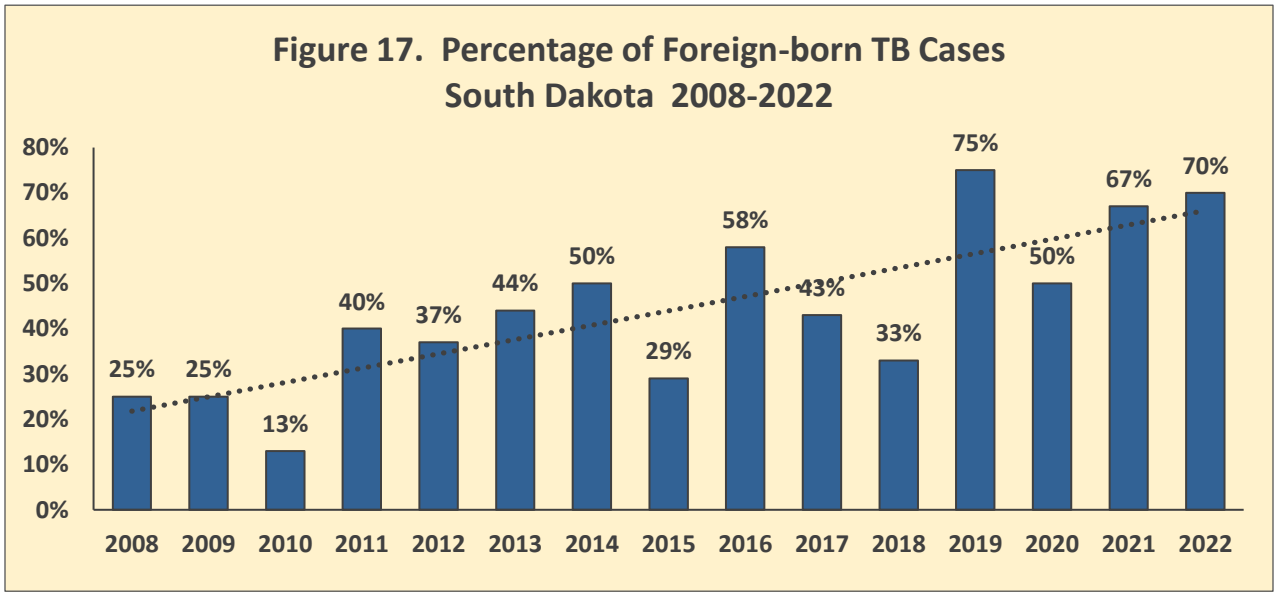


Figure 16 illustrates the number of patients with reportable latent TB infection that started and completed an appropriate course of treatment. Since some treatment options can last up to 9 months, some patients were still in the process of completing their treatment at the time this report was prepared.

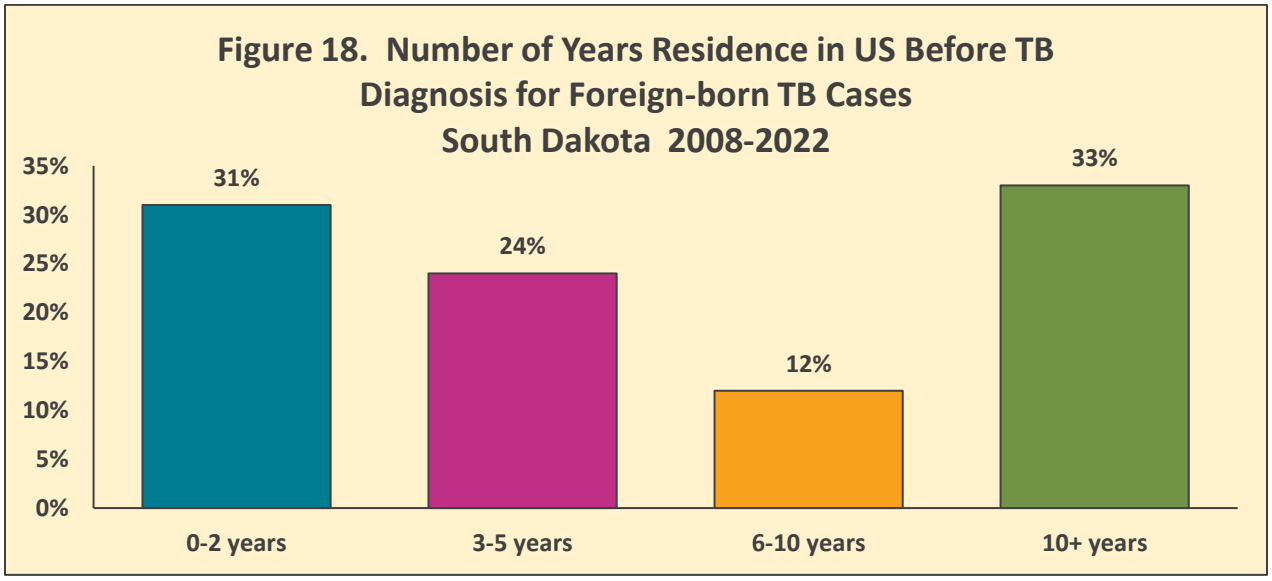


SUMMARY OF TB IN FOREIGN-BORN PERSONS IN SOUTH DAKOTA

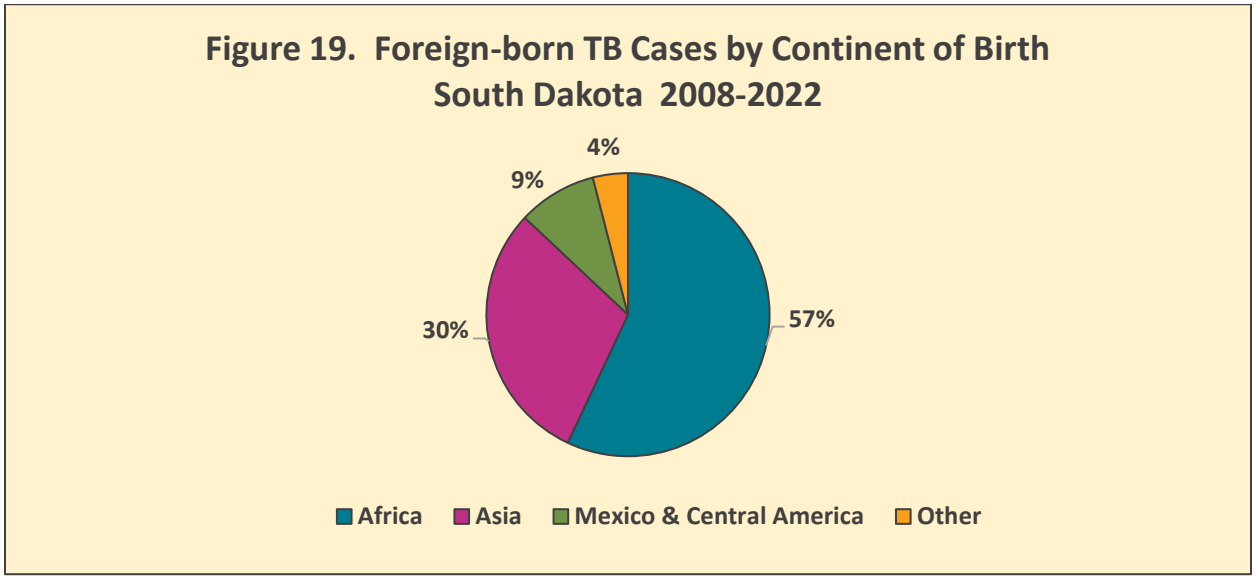
TB cases in persons who were born outside the United States continues to represent an important risk group in the United States as well as in South Dakota. Figure 17 describes the percentage of foreign-born TB cases in South Dakota which has steadily increased in the last 15 years.



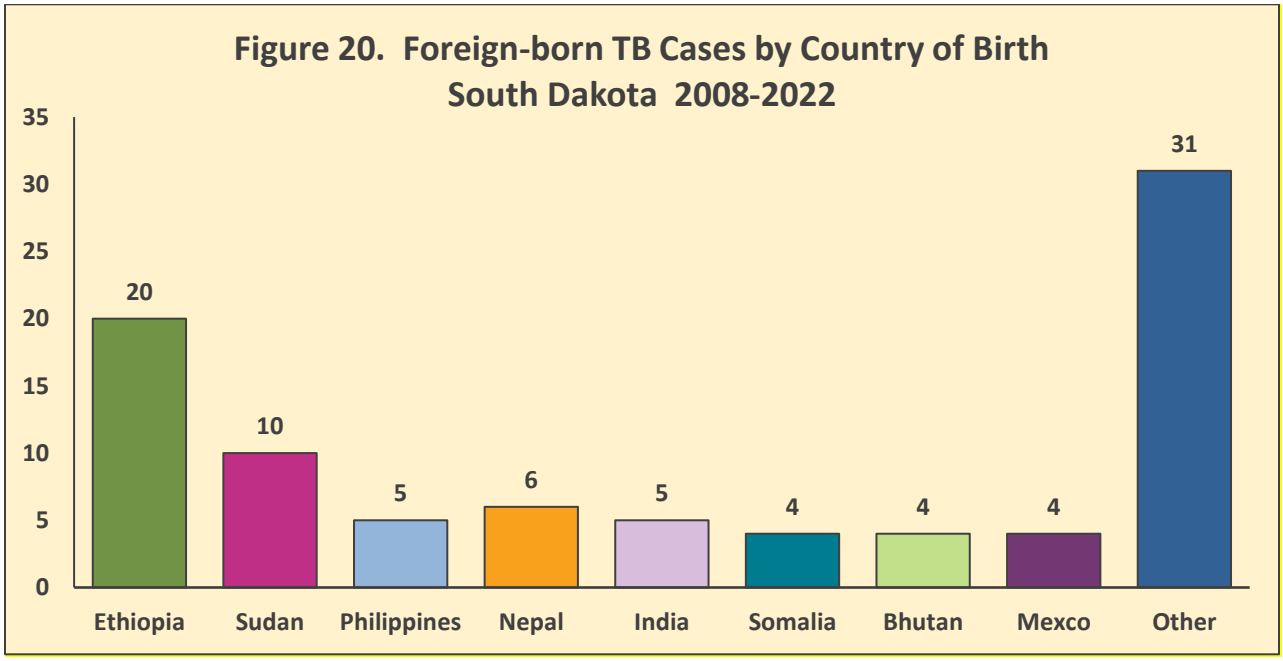
Most foreign-born persons who develop active TB usually do so within the first 5 years after arrival into the United States. Figure 16 illustrates that 55% of foreign-born TB cases in South Dakota since 2008 developed tuberculosis within the first 5 years of their arrival. Because of this increased risk, these individuals are reported to the TB Program and offered preventive treatment and case management to reduce the likelihood that they will develop TB later in their lifetime.



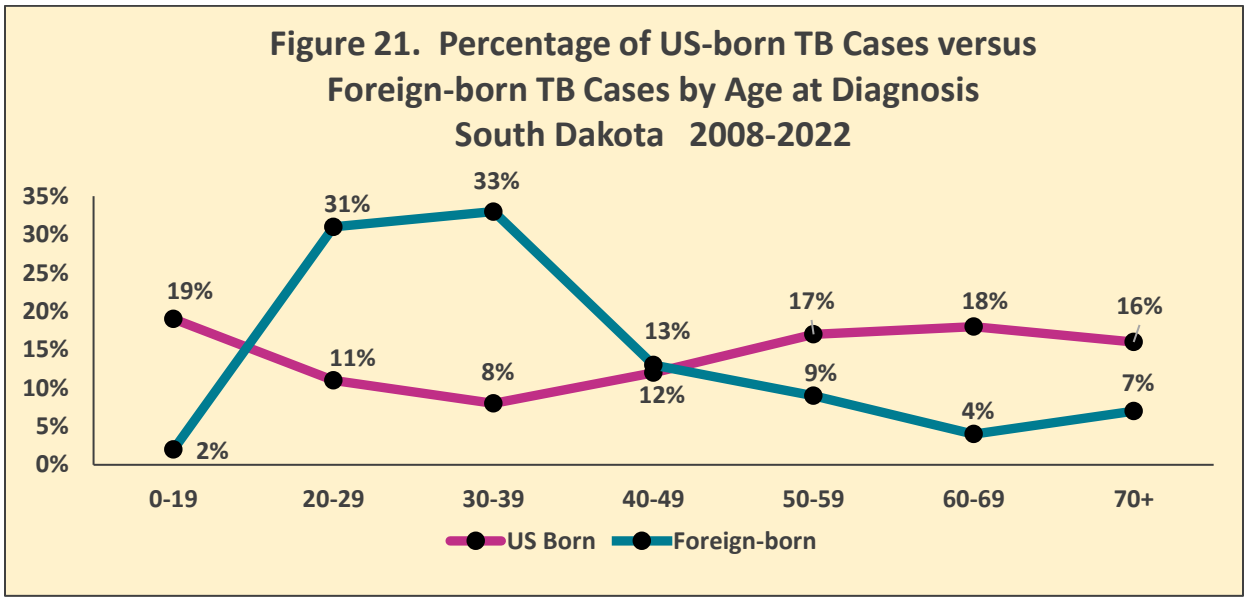
Foreign-born TB cases in South Dakota continue to arrive from all parts of the world; however, the majority are from African or Asian descent. Figure 19 describes the continent of birth for TB cases in South Dakota from 2008 to 2022.



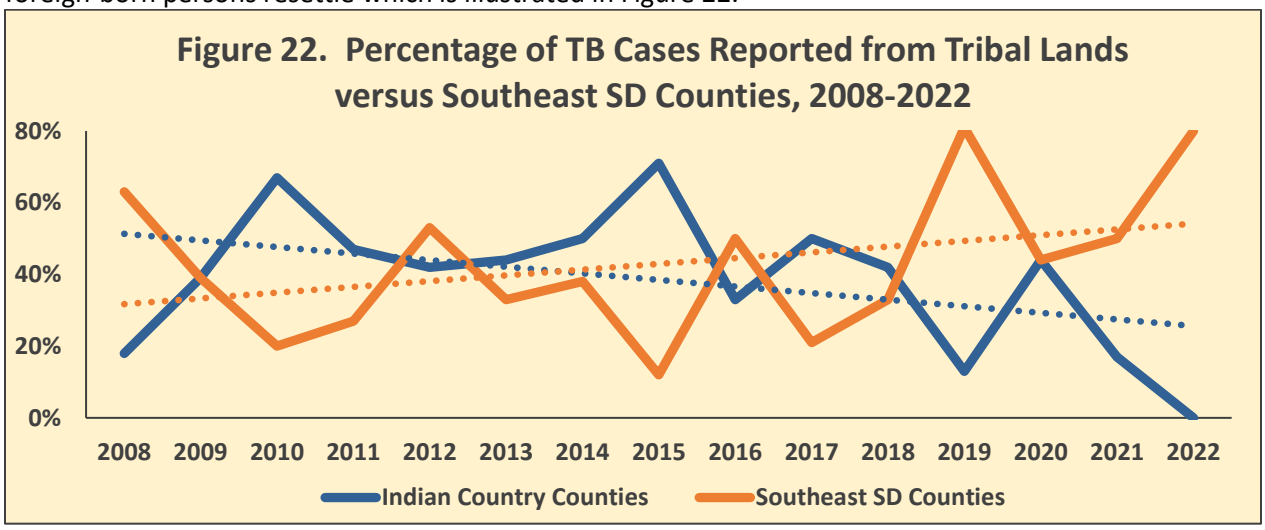
South Dakota continues to see great diversity in the countries of birth for foreign-born TB cases reported. During the 15-year time-period between 2008 to 2022, South Dakota reported TB cases who were born in 28 different countries. These cases present unique challenges due to not only language and cultural barriers but also because of some patient's cultural perceptions about tuberculosis disease, transmission, diagnosis, and treatment. Figure 20 describes the country of birth for foreign-born TB cases reported in South Dakota from 2008 to 2022. Countries of birth in the "other" category include Bangladesh, Brazil, Congo, El Salvador, Guatemala, Honduras, Kenya, Laos, Liberia, Mauritania, Myanmar, Palau, Peru, Russia, South Africa, South Korea, South Sudan, Tanzania, Thailand, and Uganda.



Foreign-born TB cases are consistently reported in younger persons as compared to US born patients in South Dakota. This presents additional challenges because these TB cases more commonly have young children who have been exposed in their homes and are also typically employed requiring a contact investigation at their worksite which increases the number of contacts that must be tested and treated. Figure 21 illustrates most foreign-born TB cases are diagnosed while young adults.



Another factor in the increase of foreign-born TB cases in South Dakota is a geographic change in the county they are reported from. Historically, most TB cases were reported from counties that included and bordered American Indian reservations. More recently there has been a shift to more TB cases reported in counties in the Southeast part of South Dakota, particularly Minnehaha County where most foreign-born persons resettle which is illustrated in Figure 22.



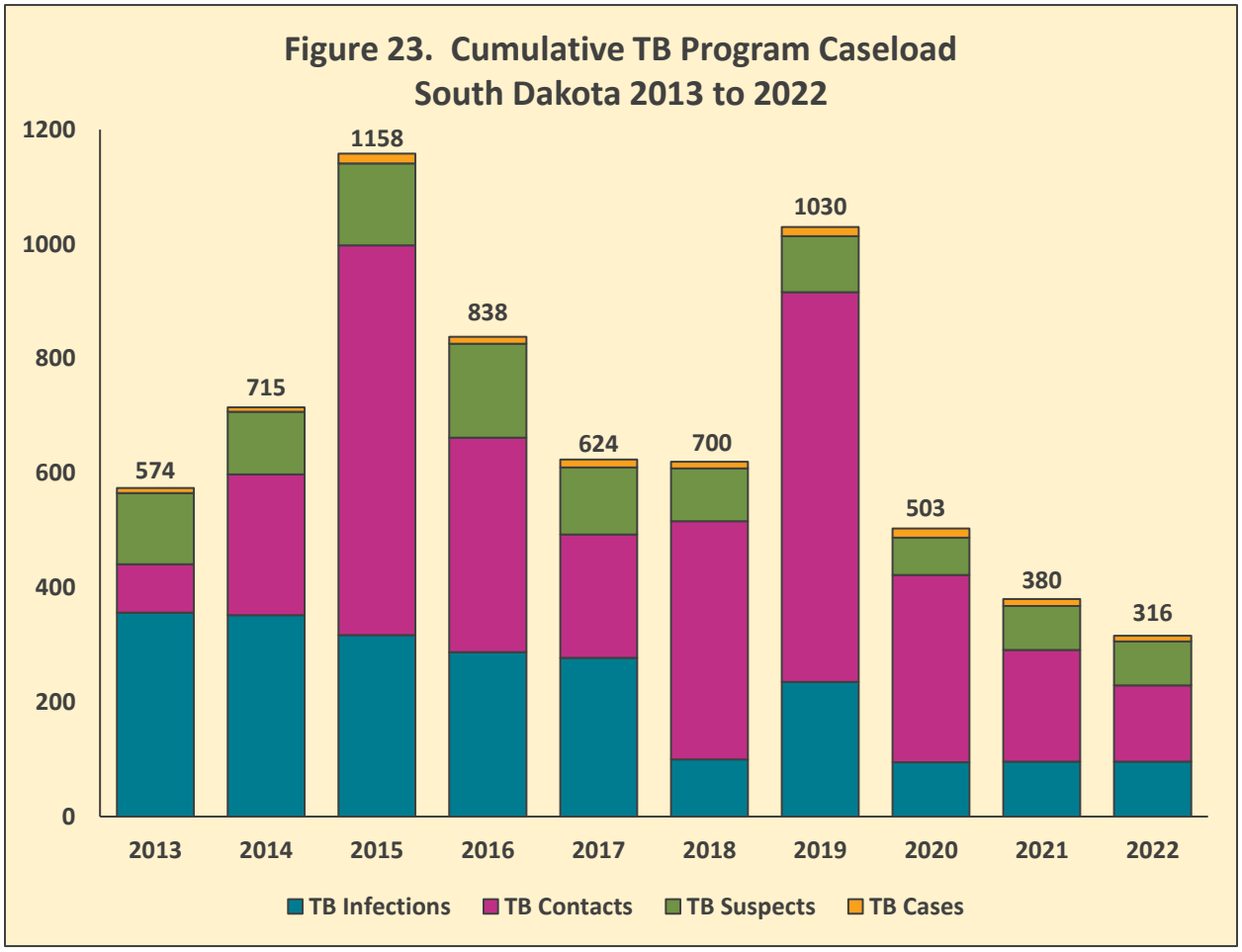
- "Tribal Lands" include the counties of Bennett, Brule, Buffalo, Charles Mix, Corson, Dewey, Jackson, Lyman, Mellette, Moody, Pennington, Roberts, Oglala Lakota, Todd, Tripp, Walworth and Ziebach.
- "Southeast SD" counties include Lincoln, Moody, Minnehaha, Turner, and Union.

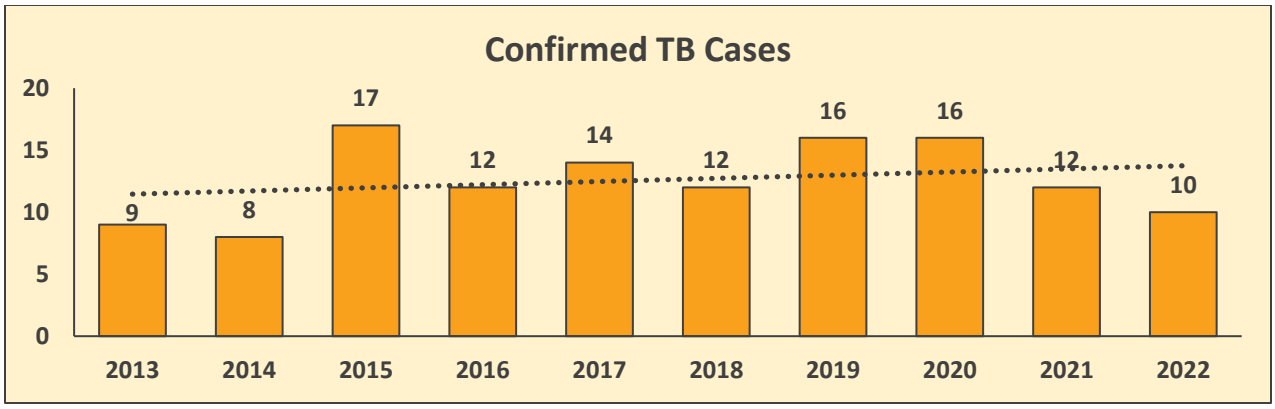
TB PROGRAM CASELOAD 2013 TO 2022

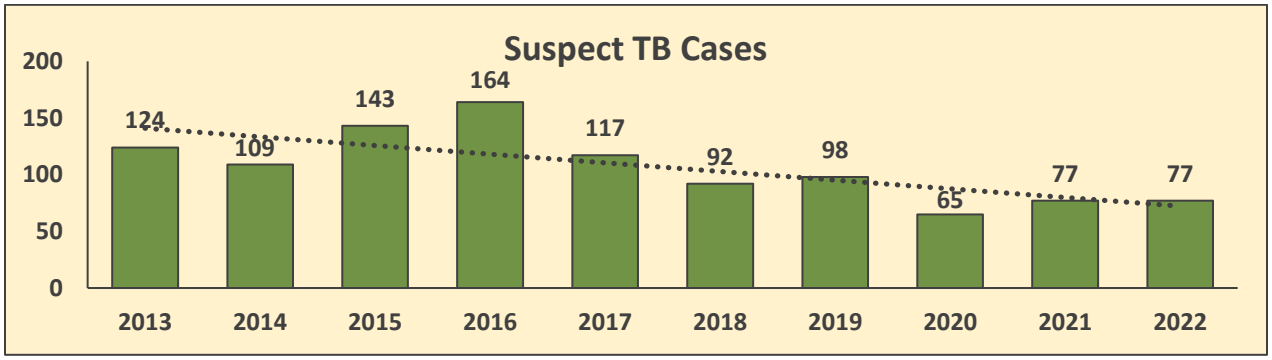
The TB Program caseload consists of four categories of patients:

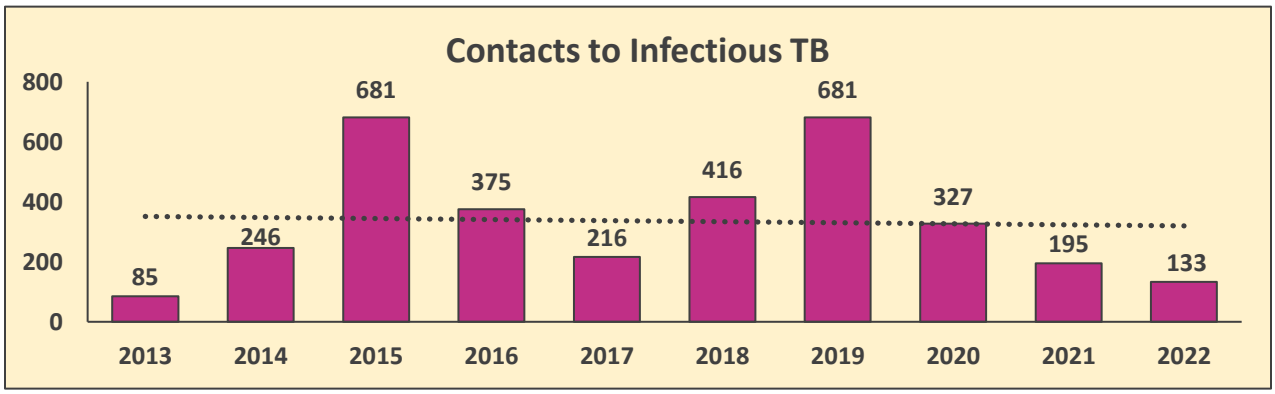
- TB cases (persons diagnosed with active TB)
- TB suspects (persons suspected of having active TB with a pending diagnosis)
- TB contacts (persons with exposure to an infectious TB case)
- TB infection (persons with latent TB infection [LTBI] reported with a positive TB skin test or positive IGRA [interferon gamma release assay] test

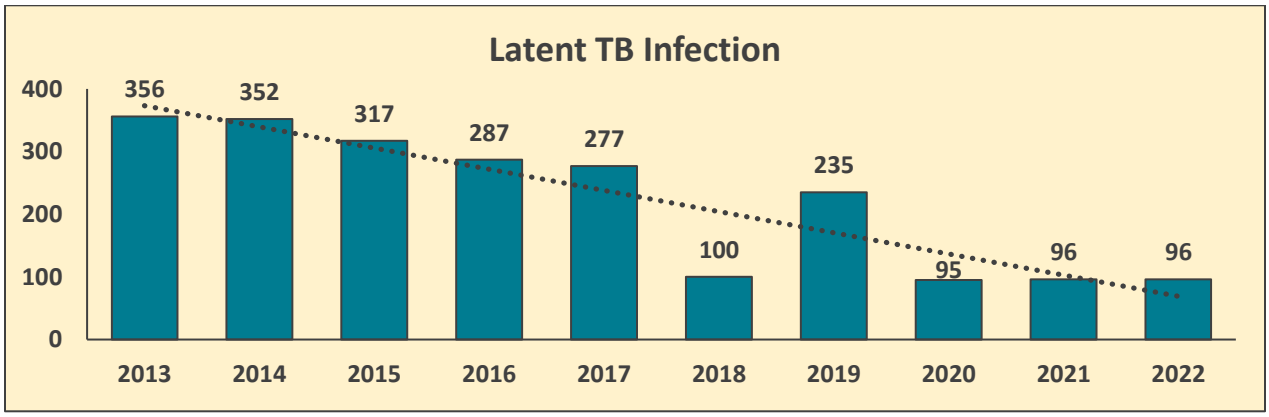
Disease Intervention Specialist (DIS) staff conduct an investigation for all patients reported from these four categories. TB cases are provided case management for the full duration of their treatment which is usually between 6 and 12 months, however treatment can be longer if they are drug resistant. TB suspects are provided case management and treatment if appropriate, until a TB diagnosis has been confirmed or ruled out. TB contacts are provided appropriate testing, medical follow-up, and treatment if appropriate. Persons with latent TB infection (LTBI) are provided case management and treatment for the full duration of their treatment which is between 3 and 9 months. It should be noted that during the last 10 years, there were 8 times as many TB suspects reported as confirmed TB cases, so most TB suspects are ruled out however they require a significant amount of DIS time and resources. Figure 23 provides the cumulative number of TB Program caseload assignments to DIS by year. These assignments are also broken out by each of the four categories on page 17.




Confirmed TB Cases
20
15
10
5
0
9
8
17
12
14
12
16
16
12
10
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022


Suspect TB Cases
200
150
100
50
0
124
109
143
164
117
92
98
65
77
77
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022


Contacts to Infectious TB
800
600
400
200
0
85
246
681
375
216
416
681
327
195
133
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022


Latent TB Infection
400
300
200
100
0
356
352
317
287
277
100
235
95
96
96
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

TB PROGRAM CONTACT INFORMATION

SOUTH DAKOTA DEPARTMENT OF HEALTH

For additional information about the TB Program, please contact the following staff or visit the South Dakota Department of Health, TB Program website at the following link:
https://doh.sd.gov/diseases/infectious/TB/

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